

### **DETAILED ACTION**

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

#### ***Claim Rejections - 35 USC § 103***

Claims 1-6, 8-15, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noritaka et al. (JP 2000-159850) in view of Mori et al. (WO 2001/51561).

Regarding claims 1 and 2: Noritaka et al. teaches a polyacetal copolymer manufactured from copolymerization of trioxane, 1,3-dioxolane in the presence of a catalyst [0010], then subjected to heating the polyacetal copolymer in a range between the melting point of the copolymer and 260°C in the presence of a quaternary ammonium compound [0007,0008,0015] in an amount corresponding to that advocated in claim 2, which corresponds to the polymer and heat treatment conditions. Since the polymer of the prior art is manufactured from the same materials set forth in the specifications of the instant application, the resulting polymer would stand to have the same generation amount of formaldehyde as that of the instant application.

Noritaka et al. does not teach the use of a hydrazide compound.

Mori et al. however discloses the use of a hydrazide compound as a formaldehyde scavenger such as adipic acid hydrazide and oxalic acid hydrazide (page 12, lines 1-19), teaching that the resin composition preferably contains a formaldehyde

scavenger in order to reduce the concentration of formaldehyde gas released from the polyacetal resin (page 11, lines 21-24). Mori et al. teach using 0.001 to 5% by weight of the formaldehyde scavenger (page 12, lines 20-23). As the objective of both inventions is to reduce the generation amount of formaldehyde in the polyacetal resin, it would have been obvious to one of ordinary skill in the art at the time of the invention to have included a hydrazide compound such as that taught by Mori et al. in the amount taught by Mori et al. in the invention disclosed by Noritaka et al to reduce formaldehyde generation.

Regarding claims 3 and 12: Noritaka et al. teaches wherein the polyacetal has a melting point of 155 to about 160°C [0024]. The range taught has sufficient specificity to anticipate the claimed range.

Regarding claims 4 and 13: Noritaka et al. teaches that the polymerization catalyst boron trifluoride is used [0012], and that the preferred range for these polymerization catalysts is between 5 ppm and 15 ppm [0013], which will achieve the instant claim of a concentration of residual fluorine of less than 13 ppm according to the applicant's specification [0045].

Regarding claims 5, 6, 14, and 15: Mori et al. teaches as an illustrative example adipic acid hydrazide, which corresponds to the applicant's claim in the instant where R<sup>5</sup> is represented by a C<sub>4</sub> hydrocarbon (page 12, lines 1-19). Furthermore, adipic acid hydrazide is one of the Applicant's preferred hydrazides and has a melting point above 160°C [0054].

Regarding claims 8 and 17: Noritaka teaches that for 100 parts of polyacetal, (A) 0.1 to 10 parts by mass of an antioxidant, a polymer or compound containing a formaldehyde reactive agent formic acid catching agent, a light stabilizer, or a mold release agent, (B) 0 to 60 parts of a reinforcing material, a conducting material, a thermoplastic, or a polyacetal resin, and (C) 0 to 5 parts of a paint may be used [0025].

Regarding claims 9-11 and 18-20: Noritaka et al. are silent about the emissions of formaldehyde. However, since the same measures are being taken to prevent formaldehyde emission (inclusion of the ammonium salt and hydrazide in corresponding quantities) the physical properties of the claims are intrinsically satisfied. Alternatively, the hydrazide used in the invention acts as a stabilizer and scavenger of formaldehyde, the emission amount of formaldehyde is dependent upon the amount of hydrazide used. Case law has held that "A particular parameter must first be recognized as a result-effective variable, i.e. a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. **In re Antonie**, 559 F.2d 618, 195 USPQ 6 (CCPA 1977), *MPEP 2144.05 IIB*. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to achieve the claimed emission amount through routine experimentation and thereby obtain the present invention.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noritaka et al. (JP 2000-159850) in view of Mitsuuchi et al. (5,212,222)

Regarding claims 1, 2, 5, 7, 14, and 16: Noritaka et al. teaches a polyacetal copolymer manufactured from copolymerization of trioxane, 1,3-dioxolane in the presence of a catalyst [0010], then subjected to heating the polyacetal copolymer in a range between the melting point of the copolymer and 260°C in the presence of a quaternary ammonium compound [0007,0008,0015], which corresponds to the polymer and heat treatment conditions. Since the polymer of the prior art is manufactured from the same materials set forth in the specifications of the instant application, the resulting polymer would stand to have the same generation amount of formaldehyde as that of the instant application.

Noritaka et al. does not teach the use of a hydrazide compound.

Mitsuuchi et al. however discloses the use of sebacic hydrazide compound as a heat stabilizer and formaldehyde scavenger in polyacetal compositions (column 4, line 44; column 6, lines 15-31). Mitsuuchi et al. teach using 0.01 to 5 parts by weight of the sebacic hydrazide (column 6, lines 9-14). As the objective of both inventions is to stabilize and reduce the generation amount of formaldehyde in the polyacetal resin, it would have been obvious to one of ordinary skill in the art at the time of the invention to have included 0.01 to 5 parts by weight of sebacic hydrazide such as that taught by Mitsuuchi et al. in the invention disclosed by Noritaka et al to stabilize the composition and reduce formaldehyde generation.

Regarding claims 3 and 12: Noritaka et al. teaches wherein the polyacetal has a melting point of 155 to about 160°C [0024]. The range taught has sufficient specificity to anticipate the claimed range.

Regarding claims 4 and 13: Noritaka et al. teaches that the polymerization catalyst boron trifluoride is used [0012], and that the preferred range for these polymerization catalysts is between 5 ppm and 15 ppm [0013], which will achieve the instant claim of a concentration of residual fluorine of less than 13 ppm according to the applicant's specification [0045].

Regarding claims 6 and 15: sebacic hydrazide is the Applicant's most preferred hydrazide and has a melting point above 160°C [0054].

Regarding claims 8 and 17: Noritaka teaches that for 100 parts of polyacetal, (A) 0.1 to 10 parts by mass of an antioxidant, a polymer or compound containing a formaldehyde reactive agent formic acid catching agent, a light stabilizer, or a mold release agent, (B) 0 to 60 parts of a reinforcing material, a conducting material, a thermoplastic, or a polyacetal resin, and (C) 0 to 5 parts of a paint may be used [0025].

Regarding claims 9-11 and 18-20: Noritaka et al. are silent about the emissions of formaldehyde. However, the same measures are being taken to prevent formaldehyde emission (inclusion of the ammonium salt and hydrazide in corresponding quantities) the physical properties of the claims are intrinsically satisfied. Alternatively, since the hydrazide used in the invention acts as a stabilizer and scavenger of formaldehyde, the emission amount of formaldehyde is dependent upon the amount of hydrazide used. Case law has held that "A particular parameter must first be recognized as a result-effective variable, i.e. a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195

USPQ 6 (CCPA 1977), *MPEP 2144.05 IIB*. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to achieve the claimed emission amount through routine experimentation and thereby obtain the present invention.

### ***Response to Arguments***

Applicant's arguments filed 12/28/2009 have been fully considered but they are not persuasive.

The Applicant has alleged unexpected results with respect to the amount of formaldehyde generated due to the specific selection of polyacetal and hydrazide. This is not persuasive because the claims are not commensurate in scope with the data provided. The data is for compositions comprising specific polyacetals, hydrazide compounds, nylon 6,6, antioxidant, and calcium distearate at specific concentrations. The claims are much broader than the data can support. The Office is unable to concluding anything from the data provided on page 10 of the remarks filed 12/28/2009 since TENAC-C4520 is a comparative polyacetal and not an inventive one (see comparative example 8). It was not subjected to heat treatment in the presence of a quaternary ammonium compound.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

#### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Uselding whose telephone number is (571)270-5463. The examiner can normally be reached on Monday-Thursday 6:00am-4:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton Cano can be reached on 571-272-1398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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